AMENDMENTS TO THE CLAIMS:

1. (previously presented) A biosensor for concentrating and detecting living microorganisms in a macroscopic sample in a minimal time, comprising:

a substrate;

a detection chamber disposed on said substrate and defining a volume between 1 pico-liter and 1 micro-liter, said detection chamber adapted to confine a composition containing microorganisms;

specimen concentration means connected to said detection chamber for rapidly concentrating said microorganisms in said detection chamber, said specimen concentration means including a channel structure and a retention device at said detection chamber for capturing said microorganisms from a sample stream flowing in said channel structure, said channel structure including a large inflow groove or trench, a substantially smaller channel extending to said detection chamber, and an inlet section between said inflow groove or trench and said smaller channel, said inlet section being of substantially smaller flow cross-section than said inflow groove or trench and substantially larger flow cross-section than said smaller channel;

a heater operatively connected to said substrate to heat said composition in said detection chamber; and

electrodes mounted on said substrate in communication with said detection chamber to identify AC impedance changes within said detection chamber from bacterial metabolism of said microorganisms of said composition over time.

2. (original) The biosensor of claim 1 wherein said detection chamber confines said first composition containing between 1 to 1000 microorganisms.

3. (canceled)

4. (previously presented) The biosensor of claim 1 wherein said retention device has magnetic and/or electrical attributes to confine said microorganisms.

5. (previously presented) The biosensor of claim 1 wherein said retention device has electrodes including interdigitated finger parts for generating a non-uniform electric field to confine said microorganisms.

6. (original) The biosensor of claim 5 wherein said retention device generates said non-uniform electric field periodically to confine said microorganisms at the surface of said detection chamber.

7. (previously presented) The biosensor of claim 1 wherein said retention device has mechanical attributes to confine said microorganisms.

8. (original) The biosensor of claim 1 wherein said heater maintains said compo sition within said detection chamber to a temperature of within 0.1°C of a selected temperature value.

9. (original) The biosensor of claim 1 wherein said heater applies heat to said detection chamber for several hours to stimulate microorganism metabolism.

10. (original) The biosensor of claim 1 wherein said electrodes sample AC electrical impedance at one selected frequency between 10 Hz and 1 MHz.

11. (original) The biosensor of claim 1 wherein said electrodes sample AC electrical impedance at more than one selected frequencies between 10 Hz and 1 MHz.

12. (original) The biosensor of claim 1 wherein said electrodes generate impedance data as a function of AC electrical frequency.

13. (original) The biosensor of claim 1 wherein said electrodes generate impedance phasor signals.

14. (original) The biosensor of claim 12 in combination with a computation device to compare impedance magnitude data from said detection chamber to impedance data from said detection chamber at different times and thereby identify bacterial metabolism within said first composition of said detection chamber.

15. (original) The biosensor of claim 12 in combination with a computation device to compare impedance phase angle data from said detection chamber to

impedance data from said detection chamber at different times and thereby identify bacterial metabolism within said first composition of said detection chamber.

16. (original) The biosensor of claim 13 in combination with a computation device to process said impedance phasor signals to identify bacterial metabolism within said composition of said detection chamber.

17. (original) The biosensor of claim 1 wherein said electrodes have an interdigitated spacing within said detection chamber to gather bulk impedance measurements.

18. (original) The biosensor of claim 1 wherein said electrodes are mounted on said substrate in communication with said detection chamber to identify AC impedance changes within said detection chamber from bacterial metabolism of said microorganisms of said composition over time relative to previous AC impedance values associated with said composition.

19. (currently amended) A biosensor for concentrating and rapidly detecting living microorganisms in a macroscopic sample, comprising:

a substrate;

a plurality of detection chambers disposed on said substrate, each of said detection chambers defining a volume between 1 pico-liter and 1 micro-liter;

a plurality of retention devices disposed at least in part on said substrate at respective ones of said detection chambers for capturing microorganisms from a flowing sample stream and retaining said microorganisms in said respective ones of said detection chambers;

specimen concentration means connected to said detection chambers for rapidly concentrating said microorganisms in said detection chambers, said specimen concentration means including a branching channel structure including at least one large inflow groove or trench and a substantially smaller channel extending from said inflow groove or trench to a first or most upstream one of said detection chambers;

a heater operatively connected to said substrate to heat a composition in said detection chambers; and

electrodes mounted on said substrate and disposed in communication with said detection chambers to identify AC impedance changes within said detection chambers from bacterial metabolism of said microorganisms over time.

20. (canceled)

21. (previously presented) The biosensor of claim 19 wherein said retention devices have magnetic and/or electrical attributes to confine said microorganisms.

22. (previously presented) The biosensor of claim 19 wherein said retention devices have electrodes including interdigitated finger parts for generating a non-uniform electric field to confine said microorganisms.

23. (previously presented) The biosensor of claim 22 wherein said retention devices generate said non-uniform electric field periodically to confine said microorganisms at surfaces of said detection chambers.

24. (previously presented) The biosensor of claim 19 wherein said retention devices have mechanical attributes to confine said microorganisms.

25. (canceled)

26. (previously presented) The biosensor of claim 19 wherein said electrodes have an interdigitated spacing within said detection chambers to gather bulk impedance measurements.

27. (previously presented) The biosensor of claim 19 wherein said electrodes are mounted on said substrate and disposed in communication with said detection chambers to identify AC impedance changes within said detection chambers from bacterial metabolism of said microorganisms over time relative to previous AC impedance values associated with said composition.